

CLAIMS

1. **(Original)** An optical multiplexer/demultiplexer system, comprising:
an optical filter;
a first optical isolator in optical communication with one side of the optical filter;
a second optical isolator in optical communication with an opposite side of the optical filter; and
a light disposer in optical communication with the first optical isolator.
2. **(Original)** The system of claim 1, wherein the optical filter comprises an interference optical filter.
3. **(Original)** The system of claim 1, wherein the first and second optical isolators comprise a polarizing beam splitter and a quarter-wave plate.
4. **(Original)** The system of claim 1, wherein the first and second optical isolators comprise a device that imparts a non-normal incident angle to input light beams.
5. **(Original)** The system of claim 1, wherein the light disposer comprises a baffle or a conveyance.
6. **(Original)** The system of claim 5, wherein the conveyance is selected from the group consisting of mirrors, lenses, fibers, waveguides, rhombs, total internal reflectors, and combinations thereof.

7. **(Original)** The system of claim 1, wherein the system is configured as a multiplexer.

8. **(Original)** The system of claim 1, wherein the system is configured as a demultiplexer.

9. **(Original)** An optical multiplexer/demultiplexer system, comprising:
filter means for selectively transmitting one or more wavelengths of optical energy;
a first means for isolating one or more optical signal channels;
a second means for isolating one or more optical signal channels; and
disposal means for collecting one or more optical signal channels;
wherein the first and second means for isolating are in optical communication with the filter means.

10. **(Original)** The system of claim 9, wherein the system is configured as a multiplexer.

11. **(Original)** The system of claim 9, wherein the system is configured as a demultiplexer.

12. **(Original)** A method of multiplexing optical signals, comprising:
- introducing even-parity optical signal channels to a first side of an optical filter through a first optical isolator;
 - transmitting one or more of the even-parity optical signal channels through the optical filter;
 - introducing odd-parity optical signal channels to an opposite side of the optical filter through a second optical isolator;
 - reflecting one or more of the odd-parity optical signal channels from the optical filter back to the second optical isolator; and
 - combining the reflected odd-parity optical signal channels with the transmitted even-parity optical signal channels at a multiplexed output.

13. **(Original)** An optical multiplexer/demultiplexer system, comprising:
a first optical filter;
a first optical isolator in optical communication with the first optical filter;
a second optical isolator in optical communication with the first optical isolator;
a second optical filter in optical communication with the second optical isolator;
and
a light disposer in optical communication with the second optical isolator.
14. **(Original)** The system of claim 13, wherein the first and second optical filters
comprise interference filters.
15. **(Original)** The system of claim 13, wherein the first and second optical isolators
comprise a polarizing beam splitter and a quarter-wave plate.
16. **(Original)** The system of claim 13, wherein the first and second optical isolators
comprise a device that imparts a non-normal incident angle to input light beams.
17. **(Original)** The system of claim 13, wherein the light disposer comprises a baffle
or a conveyance.
18. **(Original)** The system of claim 13, wherein the system is configured as a
multiplexer.
19. **(Original)** The system of claim 13, wherein the system is configured as a
demultiplexer.

20. **(Original)** A method of demultiplexing optical signals, comprising:

 introducing multiplexed optical signals to a first optical filter through a first optical isolator;

 transmitting one or more even-parity optical signal channels through the first optical filter;

 reflecting one or more odd-parity optical signal channels from the first optical filter back to the first optical isolator;

 directing the odd-parity optical signal channels to a second optical filter through a second optical isolator; and

 transmitting the odd-parity optical signal channels through the second optical filter.

21. **(Original)** The method of claim 20, wherein any optical energy reflected by the second optical filter is directed by the second optical isolator into a light disposer.

22. **(Original)** A method of multiplexing or demultiplexing optical signals, comprising:

introducing optical signals into a plurality of optical filters arranged in a tree structure, the filters having nearly identical free spectral ranges but being shifted in frequency.

23. **(Original)** A method of demultiplexing optical signals, comprising:

introducing multiplexed optical signals to a first optical filter that separates the optical signals into a high frequency signal region and a low frequency signal region;

directing the high frequency signal region to a second optical filter that separates the high frequency signal region into higher frequency and lower frequency optical components; and

directing the low frequency signal region to a third optical filter that separates the low frequency signal region into higher frequency and lower frequency optical components.

24. **(Original)** The method of claim 23, wherein the optical filters are half-band filters.

25. **(Original)** The method of claim 23, wherein the optical filters are part of a tree structure.

26. **(Original)** A method of multiplexing optical signals, comprising:
- introducing a first set of high frequency and low frequency optical components to a first optical filter that combines the optical components into a lower frequency signal region;
- introducing a second set of high frequency and low frequency optical components to a second optical filter that combines the second set of optical components into a higher frequency signal region; and
- directing the lower frequency signal region and the higher frequency signal region to a third optical filter that combines the signal regions into a multiplexed optical signal.
27. **(Original)** The method of claim 26, wherein the optical filters are half-band filters.
28. **(Original)** The method of claim 26, wherein the optical filters are part of a tree structure.

29. **(Original)** An optical multiplexer/demultiplexer system, comprising:

- a first boundary filter;
- a first transitional optical filter in optical communication with the first boundary filter;
- a second boundary filter in optical communication with the first transitional optical filter;
- a second transitional optical filter in optical communication with the second boundary filter; and
- a third boundary filter in optical communication with the first transitional optical filter.

30. **(Currently Amended)** The ~~method~~ optical multiplexer/demultiplexer system of claim 29, wherein the boundary filters comprise narrow bandpass optical filters.

31. **(Currently Amended)** The ~~method~~ optical multiplexer/demultiplexer system of claim 29, wherein the transitional optical filters comprise one or more half-band filters.

32. **(Original)** A method of demultiplexing optical signals, comprising:

introducing multiplexed optical channels to one or more boundary filters that remove channels that fall within a transition region between full transmission and full reflection of a transitional optical filter; and

directing the remaining multiplexed optical channels to one or more transitional optical filters that divide the optical channels into higher frequency and lower frequency signal regions.

33. **(Original)** The method of claim 32, wherein the boundary filters comprise narrow bandpass optical filters.

34. **(Original)** The method of claim 32, wherein the transitional optical filters comprise one or more half-band filters.

35. **(Original)** A method of multiplexing optical signals, comprising:
 introducing higher frequency and lower frequency optical signals to one or more
transitional optical filters that combine the optical signals; and
 introducing optical channels that fall within a transition region between full
transmission and full reflection of the transitional optical filters to one or more boundary
filters that combine the optical channels with the optical signals from the transitional
optical filters into a multiplexed optical signal.

36. **(Original)** The method of claim 35, wherein the boundary filters comprise
narrow bandpass optical filters.

37. **(Original)** The method of claim 35, wherein the transitional optical filters
comprise one or more half-band filters.